EVALUATION OF A 14 INCH MINIMUM SIZE LIMIT ON WALLEYE AT BROOKVILLE RESERVOIR

2000 Final Research Report

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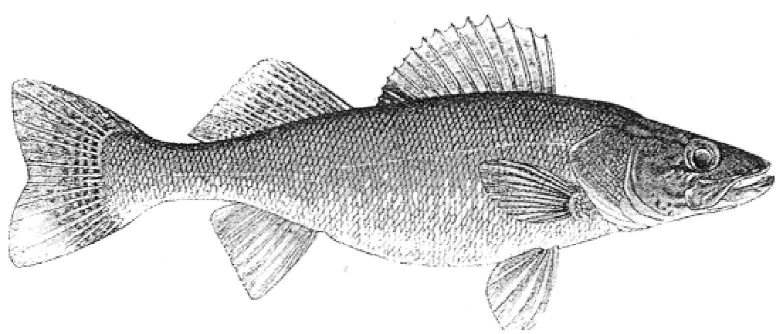

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INTRODUCTION

Brookville Reservoir is a 5,260 acre flood control impoundment located in southeastern Indiana (Figure 1). The primary focus of management at Brookville Reservoir has been to establish fishable populations of walleye and striped bass. Not only has a large walleye population been established at Brookville Reservoir, but the lake serves as the brood stock source for walleye culture, from which stockings are made throughout the state.

Walleye fishing opportunities in Indiana are hatchery dependent. Numerous creel surveys have documented the harvest of age 1 and 2 fish (less than 14 inches) (Andrews *et al.* 1994). Assuming good growth and moderate mortality, protection of these fish should result in an increased number of 14 inch and larger walleye in the lake, improving anglers chances at catching larger fish. Accordingly, a project was implemented to evaluate a 14 inch minimum size limit for walleye by monitoring the walleye populations at four lakes with fall sampling through the year 2000. Electrofishing and gill netting catch data as well as creel surveys were utilized to monitor changes in the fisheries. A 14 inch minimum walleye size limit was applied statewide in the late summer of 1996. This report concerns the fisheries investigations at Brookville Reservoir, with an emphasis on 2000, the fourth full year of the size limit. Previous reports (Ball and Schoenung 1996 and 1997, Ball 1998, 1999 and 2000) cover the 1995 to 1999 data and results.

The 14 inch minimum size limit is being evaluated statewide, and final results for the concluding report will be published after the 2001 data is collected and analyzed.

METHODS

<u>Population and Growth data</u>

Annual fall sampling was conducted for all walleye year classes each year of the study (1995-2000) to monitor changes in year class strength and rates of growth. Sampling consisted of gill netting and night electrofishing with a goal of making 12 gill net lifts and sampling 30 fifteen-minute shoreline electrofishing stations per year. The same sampling sites were repeated each year to allow for comparison of catch rates.

Walleye growth data was calculated as lengths-at-age for annual samples. Since collections are made in September or October, growth is incomplete for the particular year in which the sampling was done, and the most recent growth provided is for the previous year. Growth for each year class was averaged from the five years of sampling completed to give a comprehensive summary of growth data for all the collections. This method combined the samples for each of the year classes from each year sampled, improving the accuracy of the data.

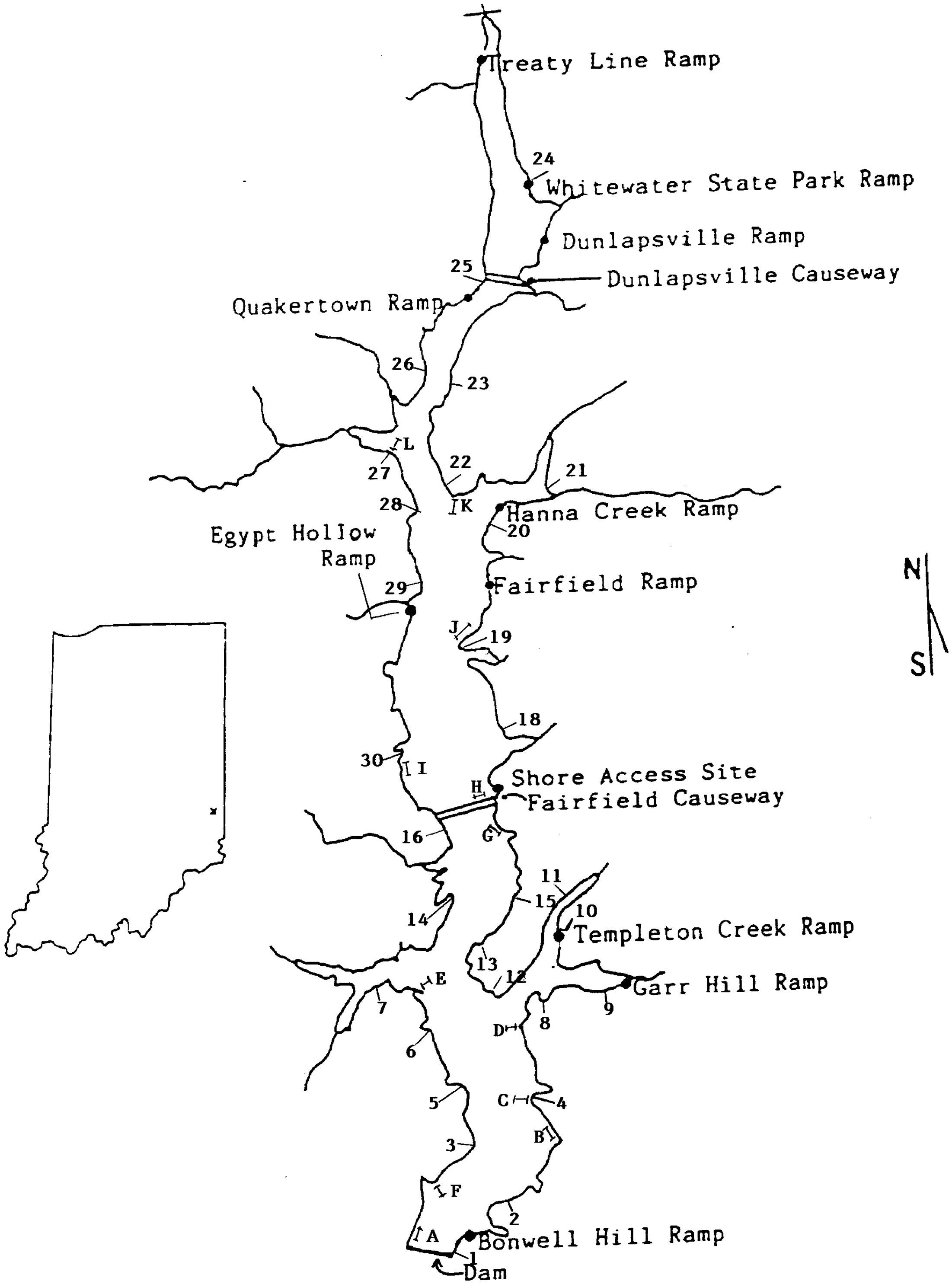

Figure 1. Brookville Reservoir, with sampling sites. Gill net sites are indicated by letters, electrofishing sites by numbers.

<u>Angler Survey</u>

A creel (angler) survey was conducted from April to October, 2000, and is reported separately (Sapp and Ball 2001). The methods used are described in that report.

RESULTS

<u>Electrofishing Catches</u>

The results of 14 years of DC fall electrofishing for walleye at Brookville Reservoir is summarized in Table 1. From 22 to 30 stations have been done each year, with stations initially selected randomly, then repeated in subsequent years. The first four years of data were collected by electrofishing 22 to 24 stations for 45 minutes each. Since then, the work has followed a Fisheries Section standard of 15 minute samples, and stations have usually numbered 29 to 30. An exception is 1994, however, when only 16 stations were done, at 15 minutes each. Minimal natural reproduction is believed to occur, as indicated by the low age 1 catch rate for 1981, showing that the naturally reproduced 1980 year class was very weak.

A record low CPUE of age 0 walleye in 1997 was followed by a modest catch rate of 9.7 age 0 per hour in 1998 (Table 1). The fall 1997 sample was about three weeks earlier than most, September 29-October 2, and surface water temperatures were warmer (70 to 72° F, compared to 58 to 63° F in 1996). However, water clarity was excellent in 1997, which improves the catch rate. In both 1998 and 1999, collections were conducted the last two weeks of October, with a temperature range of 65 to 68° F in 1998 and 56 to 59° F in 1999. Water clarity was good in both latter years, and low catch rates for the 1997 year class in both 1998 and 1999 has supported the validity of the 1997 results. In 2000, field work was conducted the third week of October, and water clarity was again good. However, heavy fog moving in early at night interfered with completing the stations, with the result that only 27 stations were completed. Extremely low abundances of age 0 fish in 1990 and 1997 seem to be related at least partly to large numbers of age 1 fish. Competition for food and predation by the age 1 walleye appeared to be significant factors. However, this relationship did not consistently hold up. In 1995 age 1 catch was 23.1/hr. and the age 0 catch 14.3/hr. In 1998 age 0 catch was 9.7/hr and age 1catch was only 1.0/hr. In 1999 and 2000, both values were very low. It is apparent that environmental conditions other than age 1 abundance also affect age 0 abundance.

Mean electrofishing catch rates over the 15 samples in Table 1 were 19.1 for age 0, 6.6 for age 1, and 11.3 for ages 1 and greater. The last four years of samples, 1997 to 2000, have averaged only 5.3 age 0 per hour. Averaged catch rates for age 1 and greater were high in 1997 and 1998 due to the strong 1996 year class. However, the last two annual samples averaged only 3.2 per hour, a sharp drop below the mean. Since this lake is the sole source within state for walleye eggs, it is crucial that the population be maintained at a high level.

Table 1. Fall electrofishing catch rates (no./hr.) and corresponding spring stockings at Brookville Reservoir. Stockings in this time period were fry exclusively.

Year	Spring stocking rate (millions)	Tot. Elec. Hrs.**	Age 0	Age 1	Ages 1 to 4
1981	15.06	16.5	12.2	0.5	13.9
1982	15.03	18.0	18.0	5.0	6.8
1983	15.18	18.0	13.6	9.5	12.4
1984	15.09	18.0	34.5	4.4	6.8
1987*	4.77	7.5	10.5	2.4	5.5
1988*	13.25	7.3	26.1	3.6	6.9
1989	9.65	6.9	25.0	3.5	4.2
1990	10.55	7.3	4.1	14.9	20.0
1994*	10.6	4.0	74.8	5.3	10.0
1995	10.7	7.3	14.3	23.1	30.6
1996	10.5	7.3	31.6	8.4	14.6
1997	10.6	7.5	0.4	13.9	18.1
1998	10.6	7.7	9.7	1.0	12.8
1999	10.5	7.5	5.7	2.4	3.5
2000	10.5	6.8	5.5	1.0	2.9
Means			19.1	6.6	11.3
SD			18.48	6.38	7.52

*1987 and 1988 CPUE data from Kiley (1989); 1994 CPUE data from Keller (1995).

Gill Netting

Eleven gill net lifts yielded 19 walleye (catch rate of 1.7/lift, Appendix 2), compared to a catch rate of 4.8 per lift in 1999 and 2.0 per lift in 1998 (Figure 2). Ages 2 to 5 were represented in the 2000 gill net catch. The catch rate was highest for age 1 walleye, contrasting to 1997 and 1998, when the catch rate was greatest for age 2 walleye. Greater age 1 average size in 1999 may have something to do with this. Both gill netting and electrofishing revealed fewer age one and older walleye. The gill net catches at Brookville had very high standard deviations (Appendix 2), so interpretation of results must be done carefully.

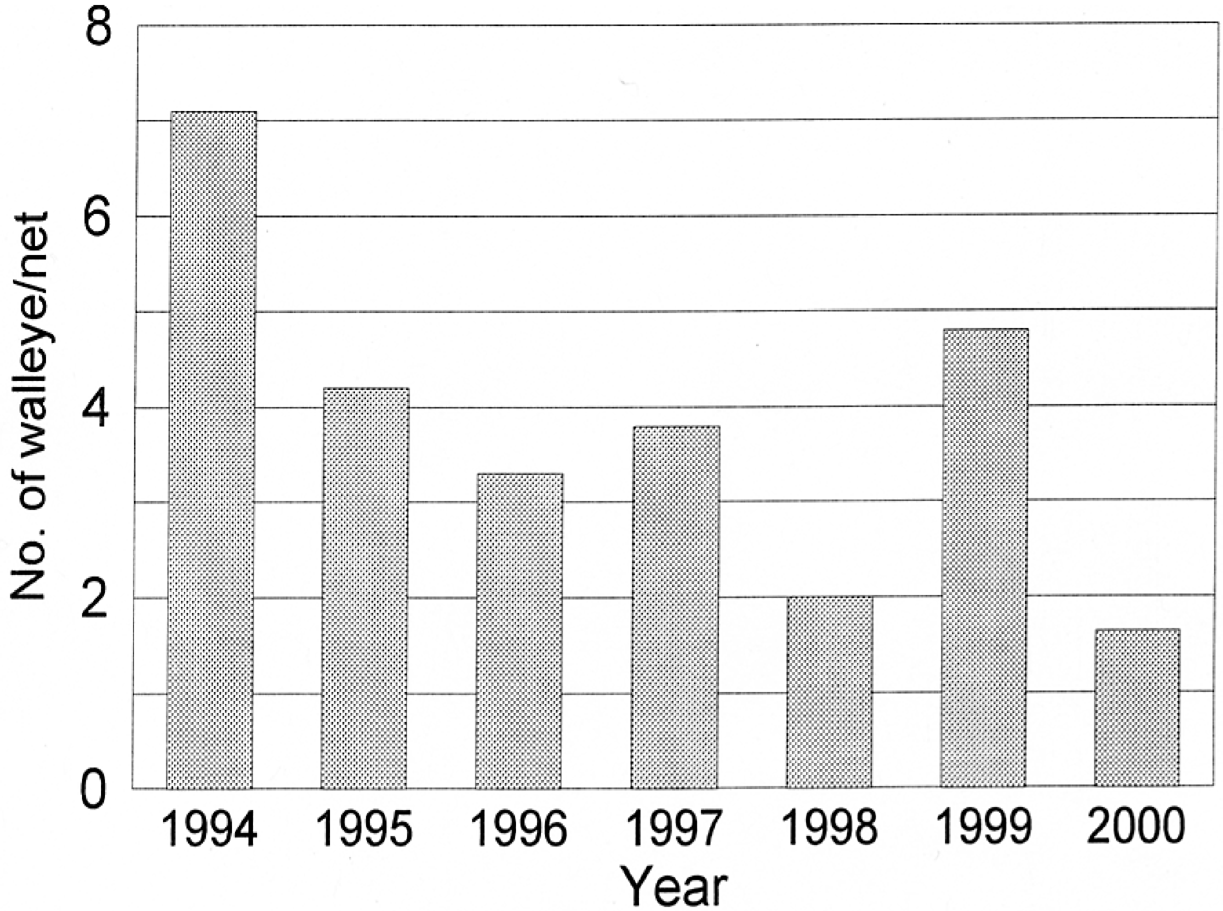

Figure 2. Walleye catch in fall gill net sets, age 1 and older. 1994 data from Keller (1995).

Age and Growth

Growth for age 1 in 1999 was higher than it had been since before 1989, due largely to a depleted year class, and consequent reduced competition (Table 2). Growth for the 1994 and 1996 year classes was slow due in part to the higher densities of these year classes. The average growth for walleye from this lake is average or better compared to many lakes. For example, compared to Carlander's (1997) average from 12 lakes in the Midwest, the 1997-99 average Brookville walleye length at age 4 is 1.7 inches greater. Compared to Brookville Reservoir walleye from 1981 to 1984 (Ball and Brown 1987), average growth has declined at ages 1 to 4, but is similar to or better for ages 5 and 6. The much more rapid growth of female walleye and greater longevity of females adds greatly to the variability of walleye growth, especially after age 4, and interpretation must be done with this in consideration. For example, the average length at age 7 of 26.7 inches for 1997 and 24.2 inches for 1998 should be considered less reliable than averages for most of the lengths at earlier ages.

Table 2. Lengths-at-age for walleye from 1995 to 1998 samples. The standard intercept value of 2.2 inches was used.

		Back-Calculated Lengths-at-Age in inches							
Year Class	**Age:**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
1999	Avg. L=	8.3							
	No.=	11							
1998	Avg. L=	6.6	12.9						
	No.=	56	15						
1997	Avg. L=	7.9	12.8	15.6					
	No.=	26	18	7					
1996	Avg. L=	6.6	11.1	15.6	16.7				
	No.=	177	73	11	2				
1995	Avg. L=	8.0	13.8	16.8	19.3	21.0			
	No.=	116	64	24	6	2			
1994	Avg. L=	7.1	13.3	16.7	19.0	19.7	23.2		
	No.=	160	80	40	21	2	1		
1993	Avg. L=	7.2	14.1	18.3	20.1	20.9	24.4		
	No.=	35	35	20	13	12	2		
1992	Avg. L=	7.2	14.0	18.4	21.5	22.2	23.3	24.2	
	No.=	62	62	62	15	12	7	3	
1991	Avg. L=	7.6	15.0	19.6	21.8	24.7	26.2	26.7	26.3
	No.=	21	21	21	21	5	3	3	2
1990	Avg. L=	8.0	13.8	19.2	22.5	23.8	26.3		
	No.=	6	6	6	6	6	3		
1989	Avg. L=	6.7	15.1	20.2	22.4	23.6	24.2	23.2	
	No.=	2	2	2	2	2	2	1	
1997-99	Avg. L*=	7.6	12.3	16.0	19.2	20.9	23.3	25.4	
1989-96	Avg. L*=	7.4	14.0	18.4	21.5	23.6	26.2		
Brookville 1981-84	Avg. L=	8.4	15.0	18.5	20.4	21.3	22.6		
Midwest**	Avg. L=	9.7	12.5	15.6	17.5	19.7	20.7	22.6	23.0

*Year classes represented by less than 3 fish are excluded from averages.
**Carlander (1997, p.225-228), 12 lake reports averaged from IA, IL, MO, and OH.

DISCUSSION

Obtaining comparable results in electrofishing catch rates among years has been stressed in this project. For example, a late September to early October sampling period was discontinued in favor of late October after seeing a low catch rate in 1997 (Ball 1998), even though this low catch rate was borne out by later sampling. Other researchers have observed that water temperature is a critical element in the catch rate for age 0 walleye in the fall (Borkholder and Parsons 2001). They recommended sampling in the water temperature range of 50 to 68F (10 to 20C) in Minnesota lakes. This range is in line with observations at Brookville Reservoir. Other factors come into play, as well. Water clarity is extremely important, and is affected by turbidity, rainfall, and wave action. The number of dippers is also important, and was kept at two since about 1990.

The minimum size limit went into effect in mid 1996, with the result that five year classes, 1996 to 2000, have now been protected by it. Support for the size limit has been very strong at Brookville, with only 1% of anglers interviewed in the 2000 angler survey opposed to the change. Also, only one walleye below the limit was checked by the clerk in 2000. The variability of year class strength has tended to mask the effects of the minimum size limit, however. For example, the large 1994 year class had already passed the 14 inch average length by the end of 1996, before the new size limit could have had more than minimal effect. Slow growth and increased natural mortality may have affected this year class more than the harvest. The 1996 year class was the last strong year class until 2001, with intervening year classes being sharply lower in abundance, especially considering the average success of year classes at this lake. The smaller year classes since 1996 probably benefitted from the size limit, since natural mortality typically declines with reduced densities.

An angler survey conducted in 2000 at Brookville Reservoir showed that the annual walleye harvest was down sharply at 2,509 fish (Sapp and Ball 2001), compared to the previous survey, 1994, when it was estimated at 4,501 (Keller 1995). The minimum size limit was expected to cause a significant drop in numbers caught, so a decline was expected. However, the 44% reduction was greater than that accountable to the size limit alone. Only about 18% of the walleye harvested in 1994 were smaller than the 14 inch size limit (Keller 1995). In 1991, the walleye harvest was 6,563 fish, indicating a progressive decline starting before the minimum size limit began. A long decline in the walleye population relating to poor age 0 survival appears to be the most significant cause of the harvest reduction.

A decrease in fishing pressure also was evident, and contributed to the decline in the walleye harvest. The average weight of walleye in the harvest increased from 1.28 lb (average length of 15.3 inches) in 1994 to 1.49 lbs (average length of 16.2 inches) in 2000. The angler interview data showed that the size limit was effective in protecting walleye smaller than 14 inches. Also, the angler survey found that 11% of the legal-size catch was released, revealing a catch-and-release ethic among anglers for this species, but not as strong as that for largemouth bass (Table 3).

The stocking rate for walleye fry has remained at 2,000 fry per acre since 1990, compared to 3,000 per acre prior to that year. Walleye survival to first fall (Age 0) has first risen, then decreased sharply over that time period (Figure 4). Catch rates in 1994 (74.8 Age 0/hr) and 1996 (31.6 Age 0/hr) were high, but from 1996 to 2000 have averaged only 5.3 per hour of electrofishing. A successful 2001 stocking (25 Age 0 walleye/h, preliminary data: Douglas Keller, Personal communication) has made a big improvement in the walleye population outlook.

Table 3. Walleye and largemouth bass catch-and-release numbers from 2000 angler survey.

	Catch-and-Release Numbers			
MONTH	**Walleye <14.0 in**	**Walleye =>14.0 in**	**Largemouth Bass <14.0 in**	**Largemouth Bass =>14.0 in**
April	38	28	1,429	514
May	164	0	550	70
June	459	146	1,482	57
July	151	0	4,299	30
August	190	0	2,831	104
September	595	0	3,642	93
October	55	21	3,457	149
Tot. Catch-and-release	1,653	196	17,690	1,016
		Walleye		Largemouth Bass
Tot. Harvest		2,509		2,612

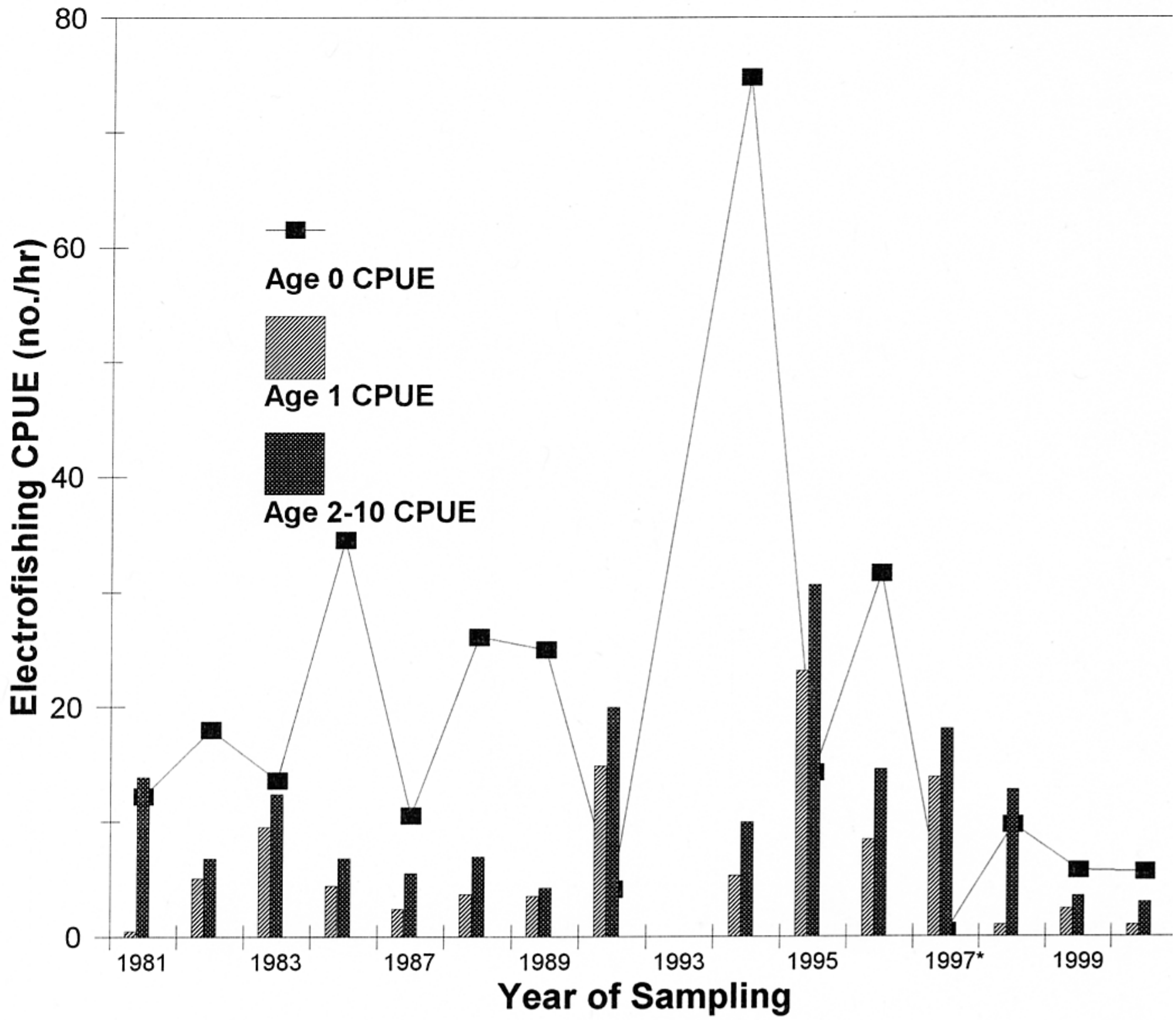

Figure 3. Walleye fall electrofishing CPUE for three age groups at Brookville Reservoir. No sampling was done in 1985-86 or 1991-93. Asterisk indicates first full year of applying the minimum size limit.

Close attention to stocking site locations may yield some improvement in age 0 survival. Highly turbid inflows from storms reduce survival of fry as they are sight feeders and feed on zooplankton in the water column, as well as reducing primary productivity of plankton. This would suggest that in wet springs, the fry stockings should be in down-lake locations. Walleye fry will do best where zooplankton is abundant (Li and Mathias 1982), but an earlier study did not show many significant differences in zooplankton densities between main channel versus cove sampling in this reservoir (Ball and Brown 1987). The wide pool above the Dunlapsville Causeway settles out some of the sediment from the East Fork Whitewater River and Silver Creek. Probably stocking should be no further up lake than the Quakertown Ramp, which is just downlake of the Dunlapsville Causeway. A variety of other sites should be used each year, since heavy inflows carry much sediment below this causeway, and spreading out the stockings into multiple locations reduces competition and utilizes the habitat better. Spreading the new fry out from the Quakertown Ramp down to Wolf and Templeton Creek coves would be the best stocking strategy except for very wet springs (which may not be predicted until after stockings are completed), when stocking would be more effective from the Hanna Creek mouth downstream to Templeton Creek. This strategy would keep new fry well above the dam, with the idea of reducing losses through the dam during early life stages. Also, the deep, open expanse of water in the lower end of the reservoir was not found to contain many walleye fry in the larval walleye distribution study (Ball and Brown 1987).

The need to delay stockings until a surface water temperature of 60°F or higher is attained, is pointed out by Keller (2002). The author concurs with this suggestion, since temperature is important to survival of walleye fry. Madenjian et al. (1996) found early lake warming in spring was correlated with strong walleye year classes in a naturally-sustained population. Li and Mathias (1982) held walleye larvae at temperatures of 64°F and greater, although they did not compare temperature regimes in their work. Since Brookville Reservoir warms up more rapidly at up-lake sites compared to down-lake sites, early season stockings might be restricted to up-lake sites (Quakertown Ramp, Hanna Creek Ramp, for example) if temperatures of 60°F are not available when fry must be stocked. Also, the recording of surface water temperatures at each fry stocking at Brookville Reservoir could provide helpful information in the future. The average temperature at the time of walleye stocking could then be compared to year class success. Temperatures recorded at the dam are not as useful as those recorded at stocking sites.

Earlier workers did not find strong correlations between postlarval abundance and abundance of age 0 walleye in the fall (Noble 1972, Forney 1976, Ball and Brown 1987). This implies that year class survival is determined after the postlarval stage is passed. In Brookville Reservoir, the abundance of small age 0 gizzard shad available in forage size ranges through the summer and fall may be the most critical factor. This would tend to provide a buffer for small walleye from predation by other fish, as well as providing food for age 0 walleye. Ball and Brown (1987) observed that small fish were the exclusive diet of age 0 walleye in the fall.

Increasing the number of fry stocked each year may not be productive, since the peak survival years of 1994 and 1996 were stocked at the reduced rate of 2,000 fry per acre. Forage availability for larval and juvenile stages during their first 6 to 7 months in the reservoir may be critical, although time of stockings (multiple fry stockings are made each year), quality of the stock, predation, reservoir inflows, and temperature regimes may also play a role. Preliminary results of fall 2001 Age 0 numbers indicate a rate of 21 fingerlings per acre, so perhaps the problem of fry survival at Brookville is now history. If low survival is a problem in the future, the possibility of stocking a combination of fry and marked fingerlings should be investigated, perhaps using oxytetracycline to mark fingerlings at the hatchery.

In conclusion, the imposition of the 14 inch walleye size limit had little observable effect on increasing the number of larger walleye in the lake. Other factors affecting age 0 walleye survival played a much more dramatic role in determining the walleye population size and number of larger individuals. However, it is recommended that the walleye size limit remain in effect. It encourages the development of a quality walleye fishing ethic, which walleye anglers support, and it assures that anglers will allow walleye to obtain a minimum quality size.

LITERATURE CITED

Andrews, S., D. Jessup, N. Ledet., S. Shipman., and T. Stefanavage. 1994. Walleye management in Indiana: Current problems and strategies. Fisheries Section, Indiana Department of Natural Resources, Indianapolis, IN.

Ball, R.L. 1998. Evaluation of a 14 Inch minimum size limit on walleye at Brookville Reservoir. 1997 Progress Report. Fisheries Section, Indiana Department of Natural Resources, Indianapolis, IN.

Ball, R.L. 1999. Evaluation of a 14 Inch minimum size limit on walleye at Brookville Reservoir. 1998 Progress Report. Fisheries Section, Indiana Department of Natural Resources, Indianapolis, IN.

Ball, R.L. 2000. Evaluation of a 14 Inch minimum size limit on walleye at Brookville Reservoir. 1999 Progress Report. Fisheries Section, Indiana Department of Natural Resources, Indianapolis, IN.

Ball, R.L., and F.C. Brown. 1987. Evaluation of factors influencing survival of walleyes in Brookville Reservoir. Fisheries Section, Indiana Department of Natural Resources, Indianapolis, IN.

Ball, R.L., and B.M. Schoenung. 1996. Evaluation of a 14 Inch minimum size limit on walleye at Brookville Reservoir. 1995 Progress Report. Fisheries Section, Indiana Department of Natural Resources, Indianapolis, IN.

Ball, R.L., and B.M. Schoenung. 1997. Evaluation of a 14 Inch minimum size limit on walleye at Brookville Reservoir. 1996 Progress Report. Fisheries Section, Indiana Department of Natural Resources, Indianapolis, IN.

Borkholder, B. D., and B. G. Parsons. 2001. Relationships between electrofishing catch rates of Age-0 walleyes and water temperature in Minnesota lakes. North American Journal of Fisheries Management 21:318-325.

Carlander, K. D. 1997. Handbook of freshwater fishery biology, Volume 3. Iowa State University Press, Ames, Iowa.

Forney, J. L. 1976. Year-class formation in the walleye (*Stizostedion vitreum vitreum*) population of Oneida Lake, New York, 1966-1973. Journal of Fisheries Research Board of Canada 33:783-792.

Keller, D.C. 1995. Evaluation of Brookville Reservoir striped bass, walleye, and muskellunge stockings and fish harvest. Fisheries Section, Indiana Department of Natural Resources, Indianapolis, IN.

Keller, D.C. 2002. Evaluation of Walleye and Striped Bass in Brookville Reservoir. Fisheries Section, Indiana Department of Natural Resources, Indianapolis, IN.

Kiley, A.L. 1989. Evaluation of walleye, striped bass and muskellunge stockings in Brookville Reservoir. Fisheries Section, Indiana Department of Natural Resources, Indianapolis, IN.

Li, S., and Mathias, J. A. 1982. Causes of high mortality among cultured larval walleye. Transactions of the American Fisheries Society 111:710-721.

Madenjian, C.P., J.T. Tyson, R.L. Knight, M.W. Kershner, and M.J. Hansen. 1996. First-Year Growth, Recruitment, and Maturity of Walleyes in Western Lake Erie. Transactions of the American Fisheries Society 125:821-830.

Noble, R. L. 1972. Mortality rates of walleye fry in a bay of Oneida Lake, New York. Transactions of the American Fisheries Society 101:720-723.

Sapp, S.L., and R. L. Ball. 2001. Brookville Reservoir creel survey. 2000 Research Report. Fisheries Section, Indiana Department of Natural Resources, Indianapolis, IN.

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Date: September 24, 2002

Appendix 1. 2000 Brookville Reservoir Walleye Electrofishing Catch and Catch Rates

Electrofishing Catch by Station

Station:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
Seconds:	917	900	913	913	963	882	900	910	920	910	918	930	903	1031	928	
Age Group																SubTot. Catch
Y-of-Yr.	1			1				10	1	1					1	15
Age 1			3	1												4
Age 2			1						1	2						4
Age 3		1				1				1						3
Age 4																0
Age 5																0
Age 6																0
Age 7	0	0														0
Age 8	0	0														0
Total	1	1	4	2	0	1	0	10	2	4	0	0	0	0	1	26

Electrofishing Catch by Station (Cont'd..Sta. 16-30)

Station	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	Total Hrs
Seconds	900	932	905	707	900	902	902	947	904	834	907				900	6.79944
Age Group																Total Catch
Y-of-Yr.			2		6		1	9	2		3					38
Age 1		1			1			1								7
Age 2								1			1					6
Age 3	1							1								5
Age 4								1								1
Age 5																0
Age 6															1	1
Age 7																0
Age 8																0
Total	1	1	2	0	7	0	1	13	2	0	4	0	0	0	1	58

Appendix 1. 2000 Brookville Reservoir Walleye Electrofishing Catch and Catch Rates
Cont'd.

Age Group	Average Catch Rates by Station (No. of Walleyes/Hr.) 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Y-of-Yr.	3.9	0.0	0.0	3.9	0.0	0.0	0.0	39.6	3.9	4.0	0.0	0.0	0.0	0.0	3.9
Age 1	0.0	0.0	11.8	3.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Age 2	0.0	0.0	3.9	0.0	0.0	0.0	0.0	0.0	3.9	7.9	0.0	0.0	0.0	0.0	0.0
Age 3	0.0	4.0	0.0	0.0	0.0	4.1	0.0	0.0	0.0	4.0	0.0	0.0	0.0	0.0	0.0
Age 4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Age 5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Age 6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Age 7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Age 8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	3.9	4.0	15.8	7.9	0.0	4.1	0.0	39.6	7.8	15.8	0.0	0.0	0.0	0.0	3.9

Age Group	Average Catch Rates by Station (No. of Walleye/Hr.) 16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	Avg. Catch Rate all Sta. No./hr	Catch Rate StdDev
Y-of-Yr.	0.0	0.0	8.0	0.0	24.0	0.0	4.0	34.2	8.0	0.0	11.9				0.0	5.53	10.47
Age 1	0.0	3.9	0.0	0.0	4.0	0.0	0.0	3.8	0.0	0.0	0.0				0.0	1.02	2.58
Age 2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.8	0.0	0.0	4.0				0.0	0.87	1.99
Age 3	4.0	0.0	0.0	0.0	0.0	0.0	0.0	3.8	0.0	0.0	0.0				0.0	0.73	1.57
Age 4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.8	0.0	0.0	0.0				0.0	0.14	0.73
Age 5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.00	0.00
Age 6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0				4.0	0.15	0.77
Age 7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.00	0.00
Age 8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.00	0.00
Total	4.0	3.9	8.0	0.0	28.0	0.0	4.0	49.4	8.0	0.0	15.9				4.0	8.44	12.40

Appendix 2. 2000 Brookville Reservoir Walleye Gill Net Catch and Catch Rates

AGE GROUP	GILL NET TING CATCH BY STATIONS A	B	C	D	E	F	G	H	I	J	K	Totals 0	Avg. Catch/Lift	Std. Dev. of Catches
Y-of-Yr.									1			1	0.09	
Age 1		2				1	1					4	0.36	0.577
Age 2			3		2		2		2			9	0.82	0.500
Age 3							1		1			2	0.18	0.000
Age 4			1									1	0.09	
Age 5		1							1			2	0.18	0.000
Age 6												0	0.00	
Age 7												0	0.00	
Age 8												0	0.00	
Total	0	3	4	0	2	1	4	0	5	0	0	19	1.73	1.954

Appendix 3. Brookville Reservoir fall sampling site coordinates

Electrofishing Sampling Sites (beginning locations)* Gill net sampling sites:

Site	Latitude	Longitude		Site	Latitude	Longitude
1	N39.44008	W84.99568		A	N39.44.025	W85.00411
2	N39.44858	W84.98361		B	N39.45914	W84.97982
3	N39.45965	W84.99275		C	N39.46315	W84.98271
4	N39.46326	W84.98239		D	N39.45058	W84.98182
5	N39.46639	W84.99636		E	N39.48029	W85.00148
6	N39.47424	W85.00120		F	N39.4513	W84.9986
7	N39.48098	W85.01077		G	N39.50235	W84.98835
8	N39.47868	W84.98038		H	N39.50761	W84.99358
9	N39.47840	W84.96988		I	N39.51920	W85.00401
10	N39.48508	W84.97891		J	N39.53136	W84.99694
11	N39.49237	W84.97729		K	N39.55443	W84.99828
12	N39.47866	W84.98997		L	N39.56142	W85.00855
13	N39.48669	W84.99158				
14	N39.49111	W84.99723				
15	N39.49154	W84.98683				
16	N39.50319	W84.99837				
17	N39.50943	W84.99094				
18	N39.52035	W84.98961				
19	N39.53083	W84.99645				
20	N39.54625	W84.99211				
21	N39.55632	W84.98128				
22	N39.55561	W84.99776				
23	N39.57550	W84.99751				
24	N39.59925	W84.98265				
25	N39.58767	W84.99135				
26	N39.57428	W85.00291				
27	N39.56100	W85.00708				
28	N39.55372	W85.00352				
29	N39.54136	W85.00207				
30	N39.52248	W85.00633				

* Latitude and longitude are given in degrees with decimals.